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## ANNOTATED LIST OF THE BIRDS OF THE ISLAS SECAS, GULF OF CHIRIQUÍ, PANAMÁ

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### ABSTRACT

Studies of the avifauna of Panama's many islands have made important contributions to the development of the theory of island biogeography. In addition, the islands of Panama's Pacific coast, with 38 described endemic subspecies of birds, show significant diversification at the subspecific level and as such are an important repository of biodiversity. Although some islands and island groups such as Coiba and the Pearl islands have received substantial study, there is little information on some smaller groups. We report here the first systematic study of the birds of the Islas Secas, a small archipelago in the Gulf of Chiriquí, including 5 large (25-166 ha) and many smaller islands. On 3 visits from October 2016 to April 2017, we recorded 66 species, including 10 species of seabirds, 8 species of coastal or freshwater habitats, and 48 species of land birds. The latter include 18 species that breed in the archipelago and 30 species of migrants or vagrants. We recorded breeding by 2 marine species, Magnificent Frigatebird and Brown Booby. The islands merit further study, particularly with respect to whether some of the endemic subspecies of Coiba also occur there.

## **KEY WORDS**

birds, islands, biogeography, seabirds, conservation

## **LISTADO ANNOTADO DE LAS AVES EN LAS SECAS, GOLFO DE CHIRIQUÍ, PANAMÁ**

### **RESUMEN**

Los estudios de la avifauna de las muchas islas de Panamá han hecho importantes contribuciones al desarrollo de la teoría de la biogeografía insular. Además, las islas de la costa del Pacífico de Panamá, con 38 subespecies endémicas de aves descritas, muestran una diversificación significativa a nivel subespecífico y, como tal, son un importante depósito de biodiversidad. Aunque algunas islas y grupos de islas como Coiba y el Archipiélago de las Perlas han sido estudiadas sustancialmente, hay poca información sobre algunos grupos más pequeños. Presentamos aquí el primer estudio sistemático de las aves de las Islas Secas, un pequeño archipiélago en el Golfo de Chiriquí, que incluye 5 islas grandes (25-166 ha) y muchas más pequeñas. En tres visitas desde octubre de 2016 a abril de 2017, registramos 66 especies, incluidas 10 especies de aves marinas, 8 especies de hábitats costeros o de agua dulce y 48 especies de aves terrestres. Estas últimas incluyen 18 especies que se reproducen en el archipiélago y 30 especies migratorias o vagrantes. Registramos la reproducción de dos especies marinas, *Fragata Magnífica* y *Piquero Pardo*. Las islas merecen un estudio más a fondo, en particular con respecto a si algunas de las subespecies endémicas de Coiba también se encuentran allí.

### **PALABRAS CLAVES**

**aves, islas, biogeografía, aves marinas, conservación**

### **INTRODUCTION**

Islands have been of great importance for understanding evolutionary and biogeographic processes. Their isolation often has allowed the development of endemic forms, including both species and subspecies. The communities of organisms found on islands also help to understand biogeographic processes, such as colonization and extinction (MacArthur & Wilson, 1967; MacArthur *et al.*, 1972, 1973; Gotelli & Graves, 1990; Graves & Gotelli, 1983).

The Islas Secas, a small archipelago of the Gulf of Chiriquí on the Pacific coast of Panama, are of biogeographic interest because of their proximity to Isla Coiba, which has 1 endemic species and 20 endemic subspecies of birds not found on the mainland (Wetmore, 1957, 1965, 1968; Wetmore *et al.*, 1984; Olson, 1980). Two of these subspecies have also been recorded on Isla Brincanco in the Islas Contreras east of the Secas (Olson, 1997).

There has been no previous systematic survey of the land birds of the archipelago. G. P. Ashcraft collected specimens of a Belted Kingfisher *Megaceryle alcyon* and a Yellow-green Vireo *Vireo flavoviridis* there on 27 March 1939 (Olson, 1980). Angehr *et al.* (2014) conducted a survey of the seabirds nesting in the archipelago in 2012 as part of an inventory of the Gulf of Chiriquí in 2012. In this article, we provide the first annotated checklist of the birds of the Islas Secas, based on 3 field trips in 2016 and 2017. We also provide information on birds observed at Hannibal Bank and Isla Montuosa, south of the archipelago.

## **METHODS**

### **1. Study site**

The Islas Secas (7°58'46" N 82°01'38" W) are located in the Gulf of Chiriquí about 20 km off the coast of western Panama (Fig. 1). The group includes 5 large islands: Pargo (166 ha), Cavada (157 ha), Barracuda (65 ha), Coco (29 ha), and Canales (25 ha), plus many smaller islands and rocks.

**Fig. 1.** Location of the Islas Secas, Isla Montuosa, and Hannibal Bank in the Gulf of Chiriquí.



**Fig. 2.** Islas Secas. Brown Booby nesting sites indicated by: Pargo = 1; Mangote = 2; Barracudita Grande = 3; Barracudita Chica = 4; Mero = 5.

(Fig. 2). The larger islands are mainly covered with moderately tall deciduous forest. A resort complex and associated infrastructure including an airstrip have been constructed on the central part of Cavada, but the rest of Cavada and the other islands remain largely undisturbed.

Like other islands in the Gulf of Chiriquí, the Islas Secas were connected to the mainland when sea level was lower during the Ice Ages. Based on bathymetric charts (DMA, 1976) and the curve of post-Pleistocene sea level rise presented in Fairbanks (1989) they probably became separated from the mainland about 9000 years before the present. Cavada was inhabited by pre-Columbian peoples between

about AD 1100-1500, who hunted, fished, gathered mollusks, and also cultivated parts of the island, but the islands were found to be forested and uninhabited when they were visited by a Spanish expedition about 1631 (Linares 1968).

Hannibal Bank (7°25'03" N 82°04'55" W), about 60 km south of the archipelago (Fig. 1), is a seamount where upwelling produces an abundance of fish and other marine life. Although these conditions are likely to attract a diversity of pelagic birds, to date the occurrence of these species there has received no systematic study. Isla Montuosa (122 ha, 7°51'43" N 81°53'25" W) is about 57 km SSW of the Islas Secas. It is mostly forested except for a small area where buildings have been constructed.

## **2. Data Collection**

In order to assess the marine and land bird communities of the Islas Secas, the Sociedad Audubon de Panama (SAP) conducted 3 field trips, from 21-23 October 2016, 18-20 January 2017, and April 19-21 2017. SAP Executive Director Rosabel Miró and Director for Science George Angehr participated in all trips. Other SAP participants included Jan Axel Cubilla (October), Esther Carty (October and April), and Venicio Wilson (February and April). Maki Tazawa of the National Audubon Society of the United States participated in the January trip. On each trip, we traveled from and to Boca Chica on the mainland.

Most field work was carried out on Isla Cavada. We walked all the trails on the island at least once. We visited Isla Pargo on 23 October, and walked the trail from the north side of the island to the south side. In order to obtain information on relative abundance of land birds, on each trip Miró conducted a transect on Cavada on the trail from the resort to Playa Canales at its northern end, starting between 0700-0730

and ending between 1100-1130. On the transect all individuals seen or heard of each species were counted.

To survey nesting activity by marine species, we visited the other islands of the archipelago by small boat on the day of arrival on each trip. We counted the birds present at each island, noted reproductive activity such as courtship and nesting, and the state of development of any young present. We surveyed pelagic birds at Hannibal Bank on 19 January, and also visited Isla Montuosa on that trip. Unfortunately, due to lack of available boats, we were not able to conduct pelagic surveys in October or April.

## **RESULTS**

We identified 66 species on our surveys. In 4 additional cases we were able to identify birds to species-group but not to species. The identified species included 10 seabirds, 8 other species associated with aquatic habitats (shorebirds, herons, raptors, and a kingfisher), and 49 land birds. Of these, 22 species breed or probably breed in the archipelago, including 2 seabirds, a heron, a raptor, and 18 species of land birds, one of which migrates out of Panama during the non-breeding season. A list of all species recorded is provided in Table 1.

**Table 1.** Bird species recorded in the Islas Secas and at Hannibal Bank on PAS surveys in October 2016 and in January and April 2017. Habitat: M = marine; A = associated with aquatic habitats; T = terrestrial. Status: M = non-breeding migrant; R = breeding resident; V = visitor (a species that breeds in Panama but is probably a visitor from the mainland instead of a resident in the archipelago); BM = breeding migrant (a species that breeds in the archipelago but migrates out of Panama in the non-breeding season); R/M = a species represented by both a resident breeding population and migrants. Species recorded only at Hannibal Bank are indicated by an asterisk (\*).

Scientific name	English name	Habitat	Status
<i>Patagioenas cayennensis</i>	Pale-vented Pigeon	T	R
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	T	M
<i>Coccyzus minor</i>	Mangrove Cuckoo	T	M
<i>Chordeiles acutipennis/C. minor</i>	Lesser/Common Nighthawk	T	M?
<i>Chaetura vauxi</i>	Vaux's Swift	T	V
<i>Chlorostilbon assimilis</i>	Garden Emerald	T	R
<i>Amazilia tzacatl</i>	Rufous-tailed Hummingbird	T	R
<i>Charadrius semipalmatus</i>	Semipalmated Plover	A	M
<i>Actitis macularius</i>	Spotted Sandpiper	A	M
<i>Tringa incana</i>	Wandering Tattler	A	M
<i>Stercorarius</i> sp.	Jaeger sp.	M	M
<i>Onychoprion anaethetus</i>	Bridled Tern	M	V
<i>Chlidonias niger</i>	Black Tern	M	M
<i>Sterna paradisaea</i>	Arctic Tern	M	M
<i>Sterna elegans/S. maxima</i>	Elegant/Royal Tern*	M	M
<i>Ardeenna pacificus</i>	Wedge-tailed	M	M



	Shearwater*		
<i>Puffinus subalaris</i>	Galapagos Shearwater	M	M
<i>Phaethon aethereus</i>	Red-billed Tropicbird*	M	M
<i>Fregata magnificens</i>	Magnificent Frigatebird	M	R
<i>Sula neboxii</i>	Blue-footed Booby	M	V
<i>Sula leucogaster</i>	Brown Booby	M	R
<i>Pelecanus occidentalis</i>	Brown Pelican	M	V
<i>Ardea herodias</i>	Great Blue Heron	A	M
<i>Nyctanassa violacea</i>	Yellow-crowned Night-Heron	A	R?
<i>Coragyps atratus</i>	Black Vulture	T	V
<i>Cathartes aura</i>	Turkey Vulture	T	V
<i>Pandion haliaetus</i>	Osprey	A	M
<i>Buteogallus anthracinus</i>	Common Black-Hawk	A	R
<i>Megaceryle alcyon</i>	Belted Kingfisher	A	M
<i>Milvago chimachima</i>	Yellow-headed Caracara	T	V
<i>Falco sparverius</i>	American Kestrel	T	M
<i>Falco ruficularis</i>	Bat Falcon	T	V
<i>Falco peregrinus</i>	Peregrine Falcon	T	M
<i>Camptostoma obsoletum</i>	Southern Beardless-Tyrannulet	T	R
<i>Myiopagis viridicata</i>	Greenish Elaenia	T	R
<i>Elaenia flavogaster</i>	Yellow-bellied Elaenia	T	R
<i>Elaenia chiriquensis</i>	Lesser Elaenia	T	R
<i>Sublegatus arenarum</i>	Northern Scrub-Flycatcher	T	R
<i>Contopus virens</i>	Eastern Wood-Pewee	T	M
<i>Empidonax</i> sp.	Flycatcher sp.	T	M
<i>Myiarchus panamensis</i>	Panama Flycatcher	T	R
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	T	M
<i>Pitangus sulphuratus</i>	Great Kiskadee	T	R
<i>Myiodynastes maculatus</i>	Streaked Flycatcher	T	R

<i>Tyrannus melancholicus</i>	Tropical Kingbird	T	R
<i>Vireo flavifrons</i>	Yellow-throated Vireo	T	R
<i>Vireo philadelphicus</i>	Philadelphia Vireo	T	M
<i>Vireo olivaceus</i>	Red-eyed Vireo	T	M
<i>Vireo flavoviridis</i>	Yellow-green Vireo	T	BM
<i>Riparia riparia</i>	Bank Swallow	T	M
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	T	M
<i>Hirundo rustica</i>	Barn Swallow	T	M
<i>Catharus ustulatus</i>	Swainson's Thrush	T	M
<i>Turdus assimilis</i>	White-throated Thrush	T	V
<i>Parkesia noveboracensis</i>	Northern Waterthrush	T	M
<i>Mniotilta varia</i>	Black-and-white Warbler	T	M
<i>Protonotaria citrea</i>	Prothonotary Warbler	T	M
<i>Oreothlypis peregrina</i>	Tennessee Warbler	T	M
<i>Geothlypis formosus</i>	Kentucky Warbler	T	M
<i>Setophaga ruticilla</i>	American Redstart	T	M
<i>Setophaga castanea</i>	Bay-breasted Warbler	T	M
<i>Setophaga fusca</i>	Blackburnian Warbler	T	M
<i>Setophaga petechia</i>	Yellow Warbler	T	R/M
<i>Coereba flaveola</i>	Bananaquit	T	R
<i>Thraupis episcopus</i>	Blue-gray Tanager	T	R
<i>Cyanerpes cyaneus</i>	Red-legged Honeycreeper	T	R
<i>Piranga rubra</i>	Summer Tanager	T	M
<i>Piranga olivacea</i>	Scarlet Tanager	T	M
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	T	M
<i>Quiscalus mexicanus</i>	Great-tailed Grackle	T	V

The land bird community of the archipelago was dominated by tyrant flycatchers (Tyrannidae), with 10 species (55% of the land birds). Most species are primarily insectivorous (the flycatchers, a vireo, and a warbler), but 4 are mainly nectarivorous (2 hummingbirds, the Bananaquit *Coereba flaveola*, and the Red-legged Honeycreeper *Cyanerpes cyaneus*, although the latter 2 species also take fruit), and 2 are mainly frugivorous (a pigeon and a tanager). There was a notable lack of predators on vertebrates (the only resident raptor, Common Black Hawk *Buteogallus anthracinus*, feeds mainly on crabs) and of seed-eating species.

Based on transect data (Table 2), the most abundant species on the island was the resident form of Yellow Warbler *Setophaga petechia*, known as “Mangrove Warbler.” Other abundant species included Yellow-green Vireo *Vireo flavoviridis* (although this species is absent from the island during the non-breeding season), Yellow-bellied Elaenia *Elaenia flavogaster*, Lesser Elaenia *Elaenia chiriquiensis*, Blue-gray Tanager *Thraupis episcopus*, and Bananaquit. Among the more common migrants were Philadelphia Vireo *Vireo philadelphicus* and Swainson’s Thrush *Catharus ustulatus*, but many other migrant species were found in small numbers.

**Table 2.** Species and number of individuals of land birds observed on the trail to Playa Canales on Isla Cavada on 22 October 2016, 19 January 2017, and 21 April 2017. Migrant species are shown in italics.

Species	Number			
	10/22	1/19	4/21	Total
Black Vulture		1		1
Turkey Vulture	3	4		7
Common Black Hawk	1	3	4	8
Pale-vented Pigeon		7	5	12
<i>Yellow-billed Cuckoo</i>	1			1

<i>Mangrove Cuckoo</i>		1	2	3
Vaux's Swift	2			2
Garden Emerald	3	1	1	5
Rufous-tailed Hummingbird	3	1	2	6
Yellow-headed Caracara		2		2
Southern Beardless-Tyrannulet	2	3		5
Greenish Elaenia	3			3
Yellow-bellied Elaenia	7	22	6	35
Lesser Elaenia		22	8	30
Northern Scrub-Flycatcher	3	2	1	6
<i>Eastern Wood-Pewee</i>	1			1
Panama Flycatcher	6	2		8
<i>Great Crested Flycatcher</i>	1	1		2
Great Kiskadee		3	2	5
Streaked Flycatcher	1	2	4	7
Tropical Kingbird	1	1	1	3
<i>Philadelphia Vireo</i>		15		15
Yellow-green Vireo		30	23	53
<i>Barn Swallow</i>	2			2
<i>Cliff Swallow</i>	1			1
<i>Swainson's Thrush</i>				10
<i>Northern Waterthrush</i>	3			3
<i>Black-and-white Warbler</i>	1			1
<i>Tennessee Warbler</i>	1	4		5
<i>Kentucky Warbler</i>	1			1
Yellow Warbler (Mangrove)	28	13	25	66
Blue-gray Tanager	11	3	9	23
Red-legged Honeycreeper	1	3	10	14
Bananaquit	14	12	1	27
<i>Summer Tanager</i>		1		1

About 200 adult Magnificent Frigatebirds were present around the nesting colony on Isla Coco in October, and 280 were counted in January. No nests were observed during these surveys, although some males were seen carrying branches, probably to use in nest construction.

In April we counted a total of 40 nests and 23 downy chicks. The chicks were half to nearly full grown, suggesting that nesting had started in February.

Brown Boobies were found nesting at 5 sites (Fig. 2), at which a total of 14 downy young were observed. Breeding had finished by January, when no nests or chicks were seen, although many adults and juveniles were present around the nesting islands. Boobies were just beginning to nest again in April, when a total of 40 birds were seen sitting on nests at the 5 sites. No chicks were seen, suggesting the eggs had not yet hatched.

Only a few pelagic species were observed on our single trip to Hannibal Bank in January. The most significant records were Wedge-tailed Shearwater *Ardenna pacifica*, which is uncommon in Panama, and Red-billed Tropicbird *Phaethon aethurus*, which is rare on the Pacific side of Panama. Other significant records during our surveys included a Wandering Tattler *Tringa incana* on Isla Coco on 23 October, the first record from Chiriquí of this rare migrant, and an Arctic Tern *Sterna paradisaea* on Isla Coco on 22 October, the fourth record of the species in Panama and the second photographic record.

### **Annotated species list**

On this list, “resident” indicates a species that is permanently present in the Islas Secas and breeds there. “Visitor” indicates a species that breeds in Panama, but probably not in the Islas Secas, occasionally visiting the archipelago from the mainland. “Migrant” indicates a

species which does not breed in Panamá but is present only during seasonal migration. One species, the Yellow-green Vireo, breeds in the archipelago but migrates out of Panama during the non-breeding season. One other species, Yellow Warbler, is represented both by a resident breeding population and migrants.

**Wedge-tailed Shearwater** (*Ardenna pacifica*) Migrant. Two were seen at Hannibal Bank on 19 January.

**Galapagos Shearwater** (*Puffinus subalaris*) Migrant. Two were seen at Hannibal Bank and 2 more during our return to the Islas Secas on 19 January. One was seen en route between Boca Chica and the Islas Secas on 19 April.

**Red-billed Tropicbird** (*Phaethon aethereus*) Visitor. An adult approached and circled our boat for some time at Hannibal Bank on 19 January. The species breeds on the Caribbean coast of Panama but is rare off the Pacific coast.

**Magnificent Frigatebird** (*Fregata magnificens*) Resident. Breeds on Isla Coco. On 21 October approximately 200 birds were present around Isla Coco. No sign of nests was seen, although several males were observed carrying sticks or plucking floating branches from the water surface, apparently to use in nest construction. Approximately 280 birds were present on 18 January. We saw no definite nests, although as in October several males were observed carrying sticks (and sometimes fighting with other males for them). On 19 April, about 135 adults were present. We counted 40 nests and observed 23 downy chicks ranging from mid-sized to nearly adult size with some brown wing feathers. On all trips, scattered individuals were seen elsewhere in the archipelago or en route to the mainland. Angehr *et al.* (2014) recorded 290 nests on Isla Coco on 25 April 2012.

**Blue-footed Booby** (*Sula nebouxii*) Visitor. On 21 October 13 individuals were seen perched on an islet near Pargo, and others were seen en route to and from the islands. None were observed in January. On 19 April, we counted 71 individuals on Isla Mangote and another 8 on Barracudita Grande. No sign of nesting was seen.

**Brown Booby** (*Sula leucogaster*) Resident. Breeds on Isla Pargo and on islets near Pargo and Barracuda. On 21 October a total of 14 nests with downy young were found at 4 localities: Barracudita Grande, a small islet north of Barracuda, had 6 young, and adjacent Barracudita Chica had 5. One young was seen on the western end of Pargo, although more were probably present but hidden in dense vegetation. Two young were seen on Isla Mangote, a small islet north of Pargo. Chicks were between one-third and two-thirds grown. No nests were seen on 19 January, but a total of 218 adults and 28 juveniles was counted perched on or flying or swimming near the nesting islets. On 19 April, we found a total of 40 adults sitting on nests at 5 sites: 16 on Barracudita Grande, 8 on Barracudita Chica, 10 on the west and southwest side of Pargo, 5 on Mangote, and 1 on Isla Mero west of Barracuda. No chicks were seen, suggesting that the adults were sitting on eggs. Angehr *et al.* (2015) recorded 97 nests at the 5 sites combined on a survey on 25 April 2012. Brown Boobies were common throughout the archipelago, at Hannibal Bank, and en route to the mainland on all trips. Breeding localities are shown in Fig. 2.

**Brown Pelican** (*Pelecanus occidentalis*) Visitor. A few individuals were present around the archipelago and en route to it on each trip.

**Great Blue Heron** (*Ardea herodias*) Migrant. One was seen on the beach on Cavada on 19 January. Two were also seen on small rocky reefs west of Isla Montuosa on the same date, a very unusual habitat for this species.

**Yellow-crowned Night-Heron** (*Nyctanassa violacea*) Resident? Possibly breeds in the archipelago but could be just a visitor. On 21 October, 4 were seen on an islet near Pargo, and 2 others on the beaches on Cavada. On 19 January, 5 adults and 2 juveniles were seen Isla Mangote near Pargo, and another individual on the Islas Tres Marías.

**Black Vulture** (*Coragyps atratus*) Visitor. One was seen on Cavada on 19 January.

**Turkey Vulture** (*Cathartes aura*) Visitor. A few were seen soaring over forest on Cavada on each visit, and individuals were seen on Pargo and Coco in October. At least 1 individual seen in April belonged to the subspecies resident in Panama. Individuals of the migrant race could have been present but were not confirmed.

**Osprey** (*Pandion haliaetus*) Migrant. Individuals were seen on Cavada and Barracuda in October, and 1 was seen near Isla Mero near Barracuda on 18 January. This fish-eating species is associated with aquatic habitats.

**Common Black Hawk** (*Buteogallus anthracinus*) Resident. Seen on all trips. Common on the larger islands of Cavada, Pargo, Barracuda, and Coco, and also seen on smaller islets such as Mangote and the Tres Marias. Individuals calling and displaying in April and the presence of juveniles suggest the species breeds locally. This species is usually found in coastal habitats, and feeds mostly on crabs.

**Yellow-headed Caracara** (*Milvago chimachima*) Visitor? Single adults were seen on Pargo on 22 October and 19 April. In January, several adults were seen on Cavada each day. However, no juveniles were seen, suggesting the species may not breed in the archipelago.



**Peregrine Falcon** (*Falco peregrinus*) Migrant. One was seen on Cavada on 18 January.

**American Kestrel** (*Falco sparverius*) Migrant. A male was seen on Pargo on 22 October.

**Bat Falcon** (*Falco rufigularis*) Visitor. One was seen perched at the resort on Cavada on 22 October.

**Semipalmated Plover** (*Charadrius semipalmatus*) Migrant. Single individuals were seen on Cavada on 23 October and 19 January.

**Spotted Sandpiper** (*Actitis macularius*) Migrant. A few were present on beaches on Cavada on each trip, and on Pargo in October.

**Wandering Tattler** (*Tringa incana*) Migrant. One was seen on rocks near Coco on 23 October. The species is rare in Panama, although regularly reported from Isla Coiba. This is the first record from Chiriquí Province.

**Bridled Tern** (*Onychoprion anaethetus*) Visitor. One was seen 19 April and 6 on 21 April en route between the Islas Secas and the mainland.

**Black Tern** (*Chlidonias niger*) Migrant. Nine were seen en route to the archipelago on 21 October, 1 en route on 18 January, and a small flock of about 20 plus a few scattered individuals en route on 19 April.

**Elegant/Royal Tern** (*Thalasseus elegans* or *T. maximus*) Migrant. One individual was seen at Hannibal Bank on 19 January. The bill appeared to be thin and orange-yellow like that of Elegant Tern but photos were not definitive enough to distinguish it from Royal Tern.

**Arctic Tern** (*Sterna paradisaea*) Migrant. One was photographed on rocks off Coco on 22 October. This is just the fourth record of this species in Panama, and the second to be documented photographically.

**Jaeger sp.** (*Stercorarius* sp.) Migrant. One was seen following a fishing boat on 19 January but was not close enough to be identified to species.

**Pale-vented Pigeon** (*Patagioenas cayennensis*) Resident. Several individuals were seen or heard on Cavada on each trip, and also recorded on Pargo in October.

**Yellow-billed Cuckoo** (*Coccyzus americanus*) Migrant. One was seen on Cavada on 22 October.

**Mangrove Cuckoo** (*Coccyzus minor*) Migrant. One was seen on Cavada on 18 January and four on 19 January, an unusually large number for this species in Panama. Two were recorded on Cavada on 21 April.

**Nighthawk** sp. (*Chordeiles acutipennis* or *C. minor*) Migrant or visitor. One was seen in flight over Cavada on 22 October, but was not identified to species, being either Lesser Nighthawk *Chordeiles acutipennis* or Common Nighthawk *C. minor*. Both species occur in Panama as both residents and migrants, but a migrant would be more likely on an offshore island.

**Vaux's Swift** (*Chaetura vauxi*) Visitor. Several were seen flying over Cavada and Pargo in October. A group of 9 was seen over Cavada on 20 April.

**Garden Emerald** (*Chlorostilbon assimilis*) Resident. Fairly common on Cavada, and also seen on Pargo in October.

**Rufous-tailed Hummingbird** (*Amazilia tzacatl*) Resident. Fairly common on Cavada and seen on Pargo in October.

**Belted Kingfisher** (*Megaceryle alcyon*) Migrant. Two were seen on Cavada and 1 on Barracuda in October, 1 was seen at Isla Coco on 18 January, and 2 on Cavada on 20 April.

**Southern Beardless-Tyrannulet** (*Camptostoma obsoletum*) Resident. Fairly common on Cavada in October and January, and on Pargo in October. (The species was not recorded in April but was probably present.) The birds on the mainland of Chiriquí belong to the subspecies *flaviventre*, while an endemic subspecies, *orphnum*, which is somewhat darker above, occurs on Coiba. It would be of interest to determine the subspecies present in the Islas Secas.

**Greenish Elaenia** (*Myiopagis viridicata*) Resident. Uncommon on Cavada, and recorded on Pargo in October.

**Yellow-bellied Elaenia** (*Elaenia flavogaster*) Resident. Common on Cavada, and common on Pargo in October. The birds on the mainland of Chiriquí belong to the subspecies *pallididorsalis*, while those on Coiba belong to *subpagana*, which is somewhat darker than *pallididorsalis*. Birds on the Islas Secas appear somewhat dark, suggesting that they could belong to *subpagana*. Confirmation of the subspecies present in the Islas Secas would be of interest.

**Lesser Elaenia** (*Elaenia chiriquensis*) Resident. Common on Cavada.

**Northern Scrub-Flycatcher** (*Sublegatus arenarum*) Resident. Fairly common on Cavada and recorded on Pargo in October.

**Eastern Wood-Pewee** (*Contopus virens*) Migrant. Common on Cavada and Pargo in October.

**Flycatcher sp.** (*Empidonax* sp.) Migrant. Two individuals on Cavada on 21 October and 1 on Pargo on 23 October were identified as belonging to this genus but not to species.

**Great Crested Flycatcher** (*Myiarchus crinitus*) Migrant. One was seen on Cavada on 21 October and another there the next day.

**Great Kiskadee** (*Pitangus sulphuratus*) Resident. Common on Cavada and also present on Pargo in October.

**Streaked Flycatcher** (*Myiodynastes maculatus*) Resident. Fairly common on Cavada.

**Tropical Kingbird** (*Tyrannus melancholicus*) Resident. Common on Cavada. Also common on Pargo, and 1 was also seen on Coco in October.

**Panama Flycatcher** (*Myiarchus panamensis*) Resident. Uncommon on Cavada.

**Yellow-throated Vireo** (*Vireo flavifrons*) Migrant. One was seen on Pargo on 23 October, and 2 on Cavada on 18 January.

**Red-eyed Vireo** (*Vireo olivaceus*) Migrant. Three were seen on Pargo on 23 October, and several individuals were seen on Cavada on 20 and 21 April.

**Philadephia Vireo** (*Vireo philadelphicus*) Migrant. Very common on the north part of Cavada, where 12 were seen on 19 January. A few

others were seen on other trails on 18 and 20 January. Several were also seen on Cavada on 20 and 21 April.

**Yellow-green Vireo** (*Vireo flavoviridis*) Breeding migrant. Abundant, with many individuals calling incessantly on Cavada each day in October and in April. Many juveniles were present in April, often begging food from parent birds. None were recorded in January. This species breeds in Panama but migrates out of the country during the non-breeding season between late October and January (Ridgely & Gwynne, 1989).

**Bank Swallow** (*Riparia riparia*) Migrant. One seen flying at sea close to Cavada on 23 October.

**Cliff Swallow** (*Petrochelidon pyrrhonota*) Migrant. One seen at the airstrip on Cavada on 22 October.

**Barn Swallow** (*Hirundo rustica*) Migrant. Several seen on Cavada and Pargo in October.

**Swainson's Thrush** (*Catharus ustulatus*) Migrant. Common on Cavada and Pargo in October. Frequently heard singing in April.

**White-throated Thrush** (*Turdus assimilis*) Visitor? One was seen at the resort by Miró on 22 October. We did not observe this species elsewhere on Cavada on this trip, nor on our visits in January or April. This makes it probable that the record represents a wandering bird rather than a permanent population on the island. The record is of particular interest since it could be either the subspecies found in on the mainland in the western Panama foothills and lower highlands, *cnephus*, or the endemic subspecies found on Coiba and Brincanco, *coibensis*. The latter subspecies is ruddier than *cnephus* and has a bill that is mostly black, rather than mostly greenish olive as in

*cnephusus*. However, since the mainland subspecies is known to occasionally disperse to the lowlands between October and April (most records from the Canal Area, but one from Chiriquí; Ridgely & Gwynne, 1989), the record more likely pertains to that subspecies.

**Northern Waterthrush** (*Parkesia novaboracensis*) Migrant. Common on Cavada on all trips, and also recorded on Pargo.

**Black-and-white Warbler** (*Mniotilta varia*) Migrant. Single individuals were recorded on 21 and 22 October on Cavada.

**Prothonotary Warbler** (*Protonotaria citrea*) Migrant. Fairly common on Cavada in October and January.

**Tennessee Warbler** (*Oreothlypis peregrina*) Migrant. A few were recorded on Cavada on each visit, and one was seen 23 October.

**Kentucky Warbler** (*Geothlypis formosus*) Migrant. Individuals were seen on Cavada on 21 and 22 October.

**Blackburnian Warbler** (*Setophaga fusca*) Migrant. One individual was seen on Pargo on 23 October.

**Bay-breasted Warbler** (*Setophaga castanea*) Migrant. One individual was seen on Cavada on 18 January.

**Yellow Warbler** (*Setophaga petechia*) Resident and migrant. The resident “Mangrove Warbler” (*erithachorides* group) is the most abundant land bird in the archipelago, being recorded in forest on Cavada, Pargo, and Coco, and probably present on the other large islands. Migrants from North America (*aestiva* group) were uncommon on Cavada and 1 was seen on Pargo in October. Individuals were also seen on Cavada on 18 and 19 January.

**American Redstart** (*Setophaga ruticilla*) Migrant. One was seen on Pargo on 23 October.

**Blue-gray Tanager** (*Thraupis episcopus*) Resident. Common on Cavada, and also seen on Pargo in October. The birds on the mainland of Chiriquí belong to the subspecies *cana*, while an endemic subspecies, *cumatilis*, which is somewhat darker blue below, occurs on Coiba. It would be of interest to determine the subspecies present in the Islas Secas.

**Red-legged Honeycreeper** (*Cyanerpes cyaneus*) Resident. Fairly common on Cavada.

**Bananaquit** (*Coereba flaveola*) Resident. Very common on Cavada, and also common on Pargo in October.

**Summer Tanager** (*Piranga rubra*) Migrant. Individuals were seen on Cavada on 22 October and 19 January.

**Scarlet Tanager** (*Piranga olivacea*) Migrant. One was seen on Cavada on 22 October, and probably the same individual the following day.

**Rose-breasted Grosbeak** (*Pheucticus ludovicianus*) Migrant. One was seen on Cavada on 22 October.

**Great-tailed Grackle** (*Quiscalus mexicanus*) Visitor. This conspicuous species was not recorded in October or January, but a few individuals including both males and females were observed at the resort on 20 April. According to resort staff, the species is present on the island only seasonally.

## DISCUSSION

As expected from the small size of the islands and their distance from the mainland, the land bird community is a only small subset of that found on the mainland and on larger islands such as Coiba. The Islas Secas have only 18 species of breeding land birds, compared to about 72 breeding land birds found on Coiba. All of the species found in the Islas Secas also occur on Coiba.

Two of the species found in the Islas Secas, Southern Beardless Tyrannulet and Blue-gray Tanager, have endemic subspecies on Coiba. In addition, the subspecies of Yellow-bellied Elaenia found on Coiba differs from that on the adjacent mainland. It would be of interest to determine whether the subspecies in the Islas Secas is the same as that on Coiba or that on the mainland. We also had one sighting of White-throated Thrush in the Secas in October, which has an endemic subspecies on Coiba and another subspecies in the western foothills and lower highlands on the mainland. Because we had no subsequent records we suspect this bird was a vagrant rather than that it represented a resident population in the Secas. Since the mainland subspecies is known to wander seasonally to lowlands this record probably pertains to that subspecies rather than to the one on Coiba.

A interesting ecological feature of the bird community on the Islas Secas, as also on Isla Coiba, is that it is made up primarily of species that occur mainly in open areas or second growth on the mainland, but which inhabit the interior of tall forest on the islands. This is likely due to the fact that the species normally found in forest on the mainland are absent from the islands, allowing open country birds to expand their habitat range, a phenomenon known as “competitive release.”

We recorded lower numbers of nesting frigatebirds and boobies than were found by Angehr *et al.* (2014) during their survey in April 2010. We found only 40 Magnificent Frigatebird nests, compared to 290



recorded in 2010. We counted 14 Brown Booby nests in October, near the end of the breeding season, and 40 nests in April, when birds were just beginning to nest. In contrast, 97 Brown Booby nests were found in 2010. Nesting by seabirds can vary greatly year to year due to differences in marine conditions such as upwelling. Additional surveys would be required to determine if there are any long term trends in the number of birds nesting in the colonies in the Islas Secas.

Although the number of land birds in the Islas Secas is small, the avifauna is of scientific interest because of its relevance to questions in island biogeography and the development of endemic subspecies. The islands are of regional importance as a nesting site for seabirds, being found to have the largest colony of Magnificent Frigatebirds in the Gulf of Chiriquí in 2012 (Angehr *et. al.* 2014).

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